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(56) Documents cited

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(58) Field of search
A1B
Selected US specifications from IPC sub-class A01B

(54) Hand tools

(57) In an edged hand tool, such as a spade, shovel, hoe or mattock, which is intended in use to be driven into or through a hard material such as soil by its edge or at least one of its edges, it is proposed to serrate the edge or at least one of the edges with the objective of making the tool capable of penetrating the material with less force.

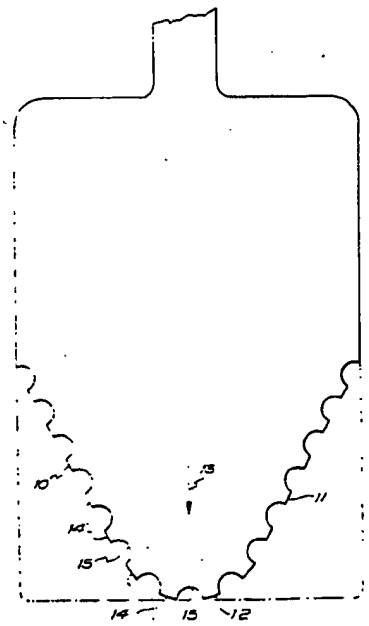

FIG 2.

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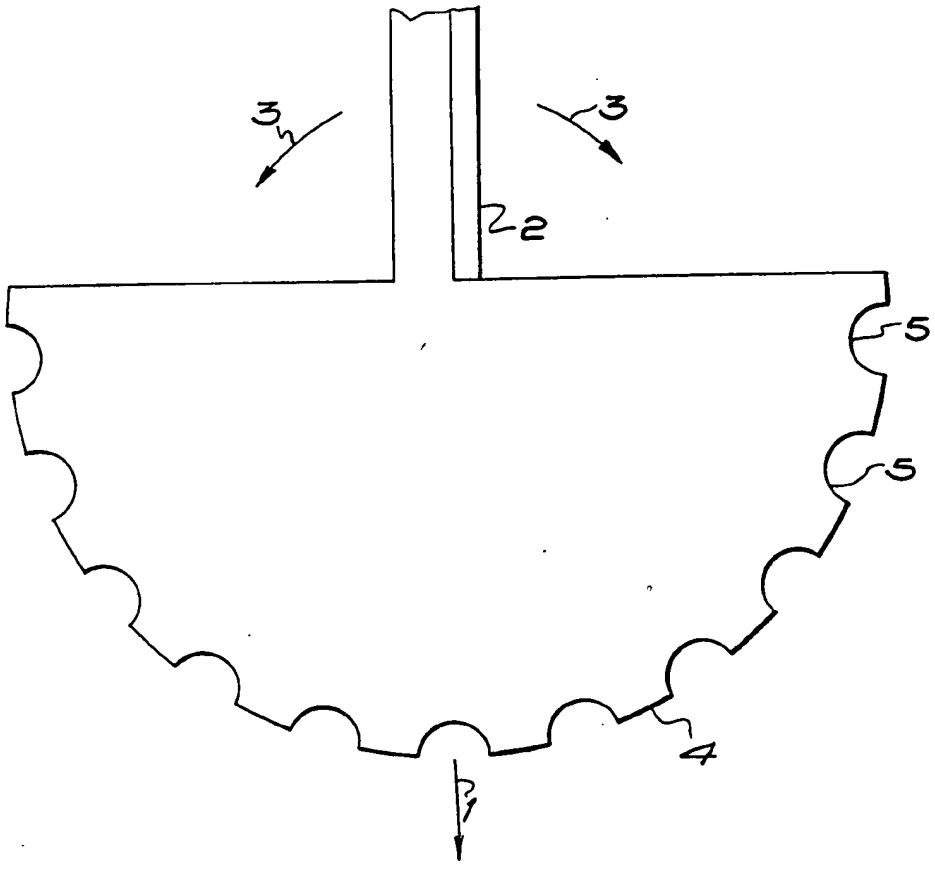

FIG. 1

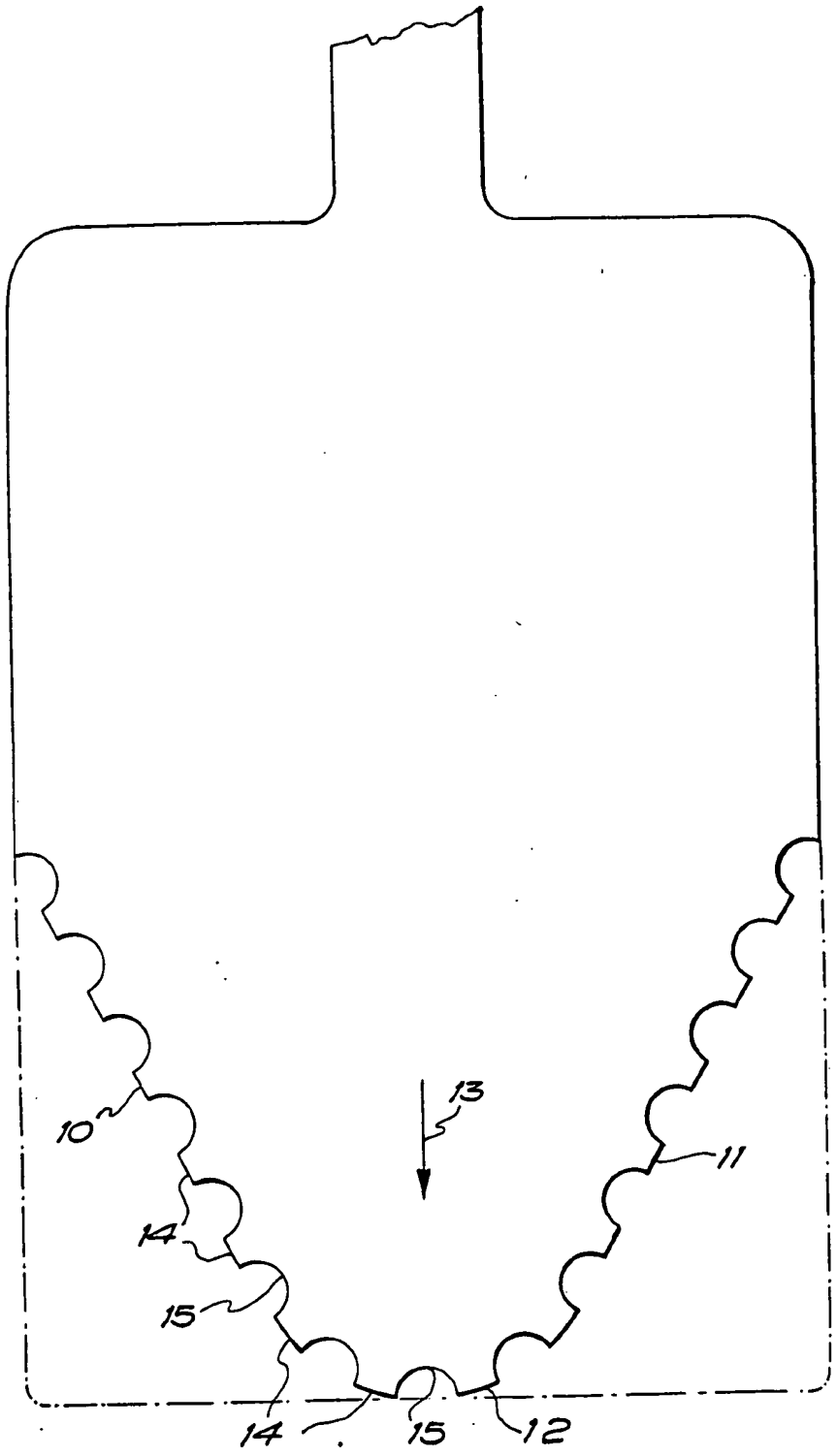

FIG. 2.

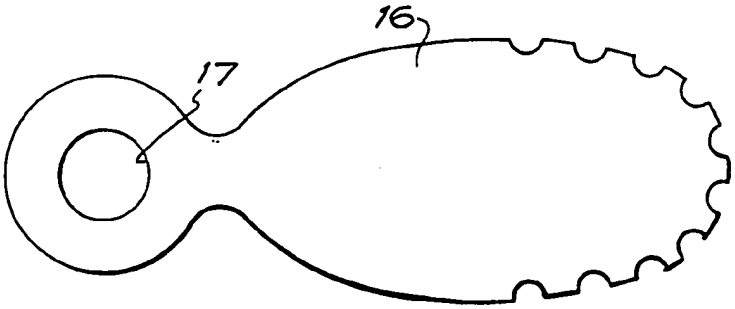

FIG. 3

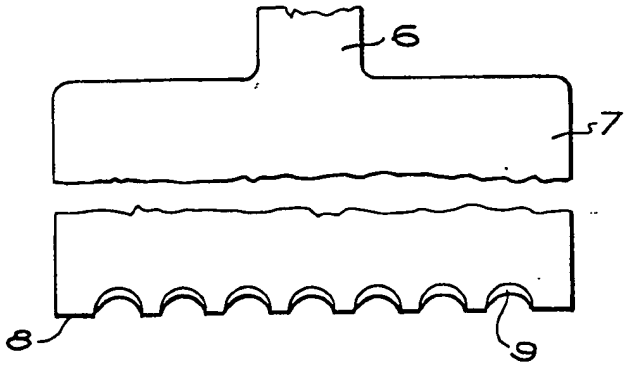

FIG. 4

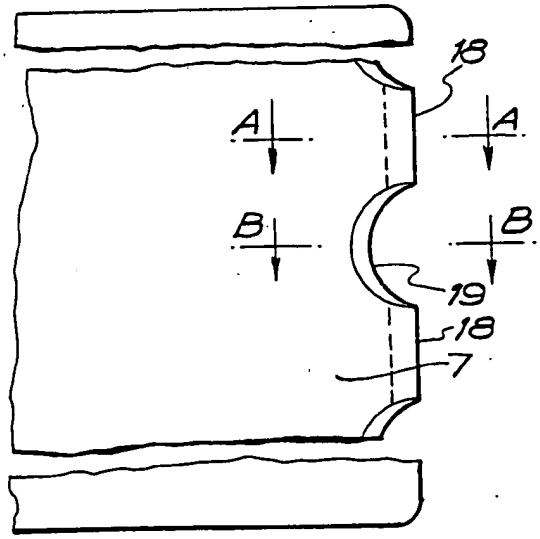

FIG. 5

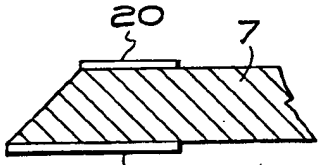

FIG. 5A

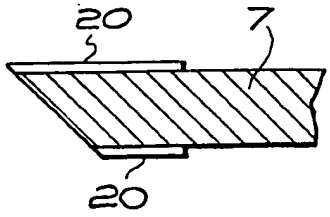

FIG. 5B

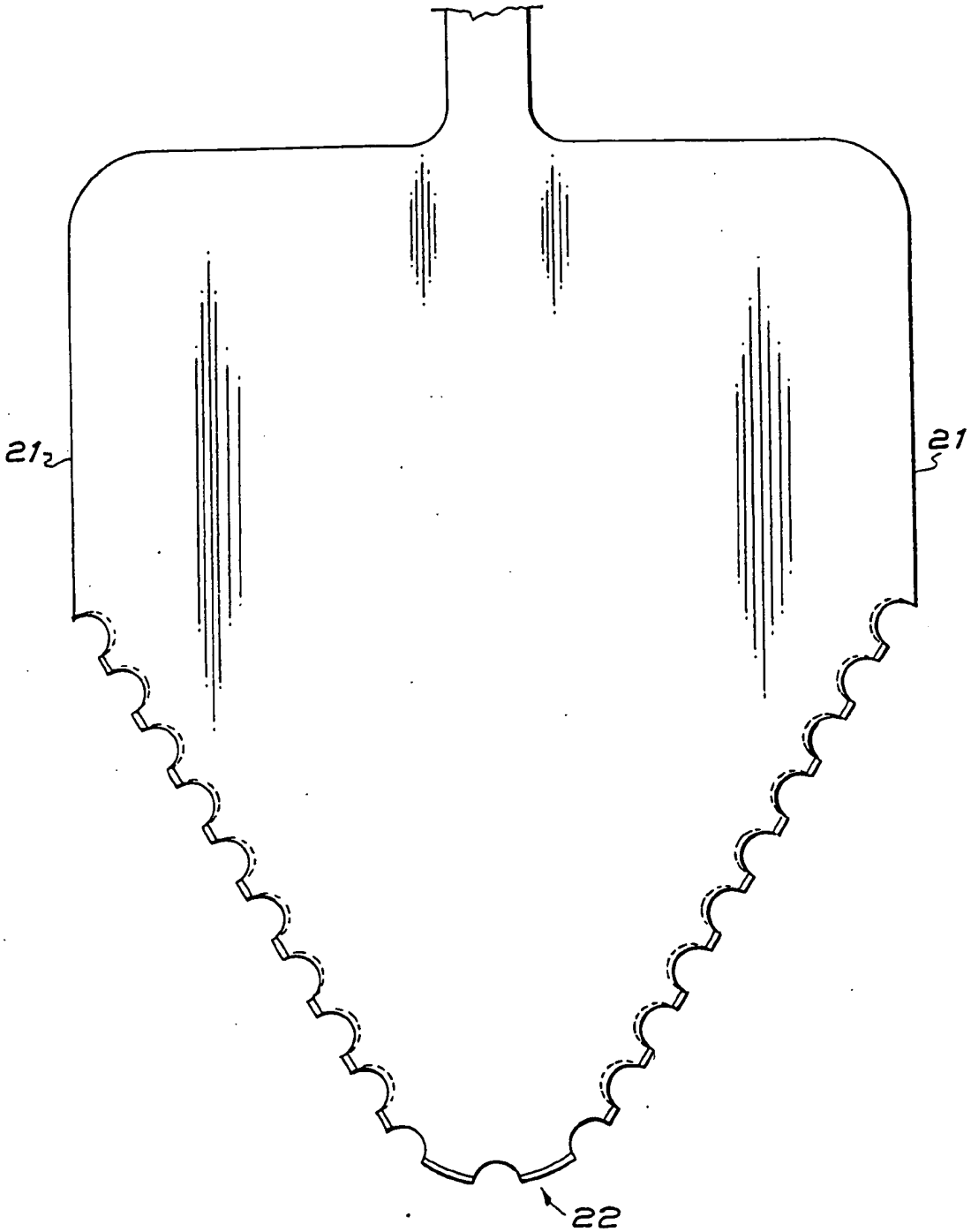

FIG. 6

Hand Tools.

The invention relates to edged hand tools, particularly but not exclusively spades, shovels, hoes and mattocks and also including axes and lawn edge trimmers.

All the tools specified above, and in general all hand tools to which the invention applies have at least one edge by which the tool is driven into or through material, such as soil, which may be very hard so that considerable force is required to penetrate it, and it is an objective of the invention to enable hand tools to be capable of penetrating material with less force than heretofore or, using the same force as heretofore, to greater depths.

According to one aspect of the invention the edge, or at least one of the edges, of the tool is serrated. The serrations may be rectilinear but in a preferred embodiment the serrations are formed by providing spaced arcuate regions along the length of the edge. The land portions of the edge between the arcuate portions, and the arcuate portions themselves, may each be tapered, and the taper in the land portions may be in the reversed direction to the taper in the arcuate portions. Preferably one or both faces of the tool adjacent the serrated edge is or are faced with a coating harder than the underlying part of the tool.

According to a further aspect of the invention a tool comprising a substantially flat blade having an edge which in use is intended to be forced into a hard material in the plane of the blade and at right angles to the edge is modified by the tapering of the edge as viewed in plan.

Embodiments of the invention will now be described by

way of example and with reference to the accompanying drawings of which:-

Figure 1 is a plan view of a D-tool for lawn edging;

Figure 2 is a plan view of the blade of a spade modified according to both aspects of the invention;

Figure 3 is a plan view of a mattock;

Figure 4 is a plan view of the blade of a spade according to the first aspect of the invention;

Figure 5 is a detail of the edge of the blade according to Figure 4; and

Figures 5A and 5B are sections on Figure 5 respectively at lines A-A and B-B.

Primarily, the tools illustrated in the drawings are used for cutting into soil but also to a greater or lesser extent into and through vegetation. Again, generally speaking, the tools illustrated comprise a relatively flat blade which in use is driven, in its own plane in the direction of its leading edge.

More specifically, the D-tool shown in Figure 1 is intended for cutting into turf by movement generally in the direction of the arrow 1 but also with a rocking movement of the handle 2 in the direction of the arrows 3. The force required to penetrate the turf in these movements is considerably lessened, relative to conventional tools of the type, by forming the edge 4, which is generally convex with spaced concave indentations 5 of much smaller radius of curvature.

Figure 4 represents a garden spade having a shaft 6

attached to a blade 7. The blade is of steel and the straight lower edge 8 which is the leading edge in use of the tool, is provided with spaced arcuate indentations 9 referred to in more detail below. In contrast to the spade of Figure 4, that shown in Figure 2 is modified by the acute tapering of the leading edge to provide two inclined cutting edges 10, 11 and only a much foreshortened leading edge 12 at right angles to the direction of the motion of the spade in use as indicated by arrow 13. Each of the edges 10, 11, 12 comprises a plurality of straight land portions 14 with arcuate indentations 15 between adjacent land portions. Each of the portions 14, 15 is bevelled to a cutting edge as will be mentioned below.

As shown in Figure 3 the mattock has a blade 16 which is, in plan view, lozenge shaped, and the portion of the blade furthest from the handle 17, and which in use provides the cutting action, is provided with a series of spaced concave indentations around the slightly convex perimeter.

Figure 5 together with Figures 5A and 5B show, specifically for the embodiment shown in Figure 4, a detail of one of the arcuate indentations between relatively straight land portions. As will be seen each of the edge portions is bevelled, the bevelling being from one face in the land portions 18 as shown in Figure 5A, and from the opposite face in the arcuate portion 19 as shown in Figure 5B. Moreover, each of the faces is provided with a coating 20 of material harder than the material of the blade 7 itself. Generally the blade will be of steel and the coating of tungsten carbide, but other suitable materials of construction may be employed.

The detailed structure shown in Figure 5 and Figures 5A

and 5B generally apply to all of the tools bearing in mind that the land portions 18 may be somewhat convexly curved in tools such as the mattock shown in Figure 3 and the edging tool shown in Figure 1. According to requirements the radius of curvature and the depth of the indentations may vary, and the length of the land portions relative to the spacing between land portions may also vary. The bevelling of the cutting edges may be between 20° and 40° and preferably about 30°. The thickness of the coating may be about 5/thousands of an inch.

Figure 6 is a plan view of a shovel similar in appearance to the space of Fig. 2 but having turned up sides. Moreover, the lip portion 22 is radiussed over a 90° arc.

CLAIMS

1. A hand tool having at least one cutting edge by which it is intended to be driven into a hard material, wherein said at least one edge is serrated.

2. A hand tool having a cutting edge which is intended to be driven into a hard material in the direction of the normal to the general line of the edge, wherein said edge is serrated.

3. A hand tool according to Claim 1 or Claim 2 wherein the serrations are formed by providing spaced concave regions along the length of the edge.

4. A hand tool according to Claim 3 wherein, in sections perpendicular to said edge, the concave portions are tapered predominantly from one face of the tool whilst the intermediate portions are tapered predominantly from the opposed face of the tool.

5. A hand tool having at least one cutting edge by which it is intended to be driven into hard material, substantially as described in relation to the drawings.